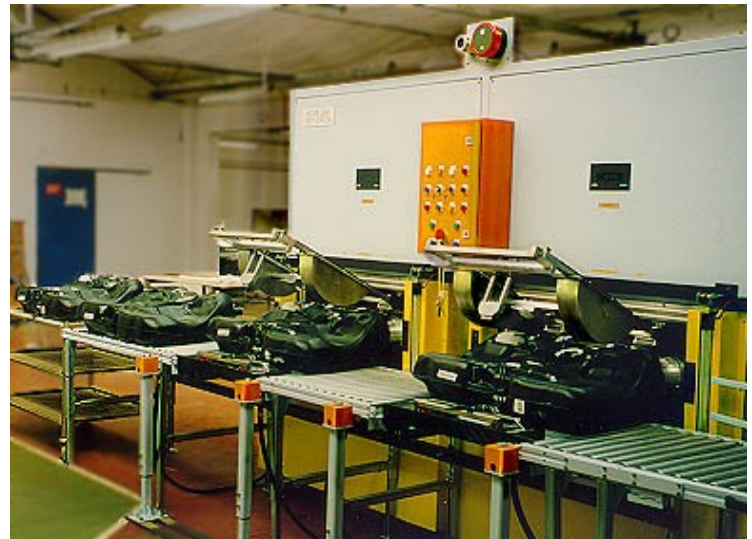


Automotive Fuel Tank Leak Testing – Dry Mass Spectrometer Method

TQC has specialised in the automatic leak testing of components for many years. Fuel tanks have previously been regarded as a leak testing problem—the volume is unstable and too large for air decay testing. Water dunk testing is operator dependent and causes longer term damage to the unpainted tank. Neither method will detect a fine vapour leak.

Now proven by several installations, TQC is able to supply Fuel Tank Leak Testing using Helium. The system provides a fast reliable dry test with numerical leak results. The sensitivity is equivalent to a “dunk tank bubble” once in several days. Connections to the tank are made automatically, the system is self-monitoring and the operator may be unskilled. The system is suitable for leak testing metal or plastic tanks.

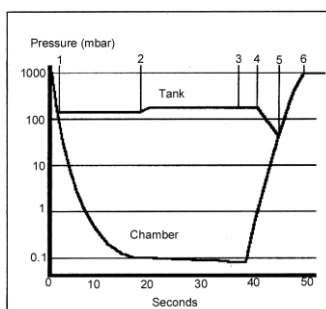


Typical Specification for a 75 litre plastic fuel tank is:

Throughput	48 second cycle (twin station unit)
Test Pressure	200mbar (3psi)
Pass/fail limit	10 ⁻⁴ mbarl/sec (0.1mm ³ /sec)
Helium usage	approx 8000 tanks/standard cylinder

Key Features

- Quantifiable leak testing
- Calibration to International Standards
- Fast, clean and dry test
- High sensitivity
- Automated pass/fail limits
- No drying costs and no tank water damage
- Unskilled operator



The Pressure Sequence

1. Pump chamber and tank
2. Dose tank when chamber reaches 0.1 mbar
3. Enter measure phase
4. Evacuate helium from tank. Vent chamber
5. Vent tank and chamber
6. Test complete

Test Description

- The fuel tank is placed in a supporting cradle which slides into a stainless steel chamber.
- Operator controls close a safety shielded chamber door.
- The sequence is automatically started by the door closure.
- The chamber and tank are pumped down together to a pressure of 180mbar, at which point the tank is isolated from the chamber.
- The chamber pressure is further reduced to less than 0.1 mbar, during which time the tank pressure is monitored to check for a gross leak.
- A 10% concentration of helium is dosed into the tank, allowed to disperse, and the chamber is sampled for leakage using a mass spectrometer.
- After the test, the helium is evacuated, the chamber and tank are vented together to atmosphere, and the door is opened automatically. Results are then data logged for SPC analysis.

Vehicle Fuel Systems: Legislation

Total vehicle and component assemblies are subject to a variety of fuel loss legislation requirements. Both US and EC evaporative emissions requirements are the subject of continued revision and it is advised that the current USA Californian certification standard be adopted as the basis for vehicle component and assembly production acceptance.

